

CLAIMS

What is claimed is:

2 1. A method comprising:

depositing a first alignment pad on a first substrate;

4 depositing a second alignment pad on a second substrate;

forming a perimeter trench around at least one of the first alignment pad or

6 second alignment pad;

depositing solder on at least one of the first alignment pad and the second

8 alignment pad;

depositing a switching fluid on the first substrate; and

10 mating the first substrate to the second substrate by aligning the first and
second alignment pads and heating the solder, the first substrate and the second

12 substrate defining there between a cavity holding the switching fluid, the cavity
being sized to allow movement of the switching fluid between first and second

14 states.

2. The method of claim 1, further comprising, after mating, hermetically sealing

2 the first substrate to the second substrate.

3. The method of claim 2, wherein hermetically sealing comprises:

2 forming a perimeter ring around the first substrate and the second
substrate, the perimeter ring being formed where the first substrate and the
4 second substrate mate together;

5 depositing a wettable seal ring in the perimeter ring;
6 dispensing a solder paste with uncured epoxy flux on at least one of the
first and second substrates; and
8 heating the solder paste.

4. The method of claim 3, wherein the solder has a higher-melting point than the
2 solder paste.

5. The method of claim 1, further comprising:
2 before mating, forming a perimeter ring in at least one of the first substrate
and the second substrate, depositing a first seal ring on at least a portion of the
4 perimeter ring and depositing a second seal ring on at least a portion of the
perimeter of the other substrate; and
6 after mating, soldering the first seal ring to the second seal ring.

6. The method of claim 1, further comprising before mating, optically
2 smoothing a surface of the first substrate that is to be mated to the second
substrate, and optically smoothing a surface of the second substrate that
4 is to be mated to the first substrate.

7. The method of claim 6, wherein optically smoothing the first substrate and
2 smoothing the second substrate comprises one of lapping, polishing, and
chemical mechanical polishing.

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8. A switch comprising:

2 first and second mated substrates, each substrate including at least one
alignment pad, wherein at least one alignment pad includes a perimeter trench
4 there around, the alignment pads soldered together, the first and second
substrates defining there between at least portions of a number of cavities;
6 a plurality of electrodes exposed within one or more of the cavities;
a switching fluid, held within one or more of the cavities, that serves to
8 open and close at least a pair of the plurality of electrodes in response to forces
that are applied to the switching fluid; and
10 an actuating fluid, held within one or more of the cavities, that applies the
forces to said switching fluid.

9. The switch of claim 8, wherein the first substrate and the second substrate are
2 hermetically sealed.

10. The switch of claim 9, further comprising a perimeter ring formed in at least
2 one of the first and second substrates, a first seal ring deposited on at least a
portion of the perimeter of the first substrate, a second seal ring deposited on at

4 least a portion of the perimeter of the second substrate, solder joining the seal
rings and epoxy flux between the solder and the first and second substrates.

11. The switch of claim 10, further comprising epoxy flux surrounding at least a
2 portion of the solder.

12. A switch comprising:

2 first and second mated substrates, each substrate including at least one
alignment pad, at least one alignment pad including a perimeter trench ring, the
4 alignment pads soldered together, the first and second substrates defining there
between at least portions of a number of cavities;

6 a plurality of wettable pads exposed within one or more of the cavities;
a switching fluid, wettable to said pads and held within one or more of the
8 cavities, that serves to open and block light paths through one or more of the
cavities in response to forces that are applied to the switching fluid; and
10 an actuating fluid, held within one or more of the cavities, that applies the
forces to said switching fluid.

13. The switch of claim 12, wherein the first substrate and the second substrate
2 are hermetically sealed.

14. The switch of claim 12, further comprising a perimeter ring formed in at least
2 one of the first and second substrates, a first seal ring deposited on at least a

- portion of the perimeter of the first substrate, a second seal ring deposited on at
- 4 least a portion of the perimeter of the second substrate, solder joining the seal
rings, epoxy flux between any solder and the first and second substrates any
- 6 place there is not a first or second seal ring.
15. The switch of claim 14, further comprising epoxy flux surrounding at least a
- 2 portion of the solder.